

## Memorandum

<b>To</b>	Henroth Investments Pty Ltd	Dan Maurici	<a href="mailto:dan@henroth.com.au">dan@henroth.com.au</a>
<b>From</b>	Scott Easton	<b>Date</b>	16 August 2019
<b>Subject</b>	Groundwater Measurements 3-12 Boondah Road, Warriewood	<b>Project No.</b>	85749.00

This provides the factual results of groundwater monitoring undertaken at 3-12 Boondah Road, Warriewood. The monitoring was carried out at the request of Henroth Investments Pty Ltd (Henroth).

Groundwater levels were measured on 8 August 2019 in wells previously installed by DP in 2016 (see attached Drawing 1). Bore 4 appears to have been destroyed.

A summary of the measured groundwater levels within the monitoring wells is provided in Table 1.

**Table 1: Summary of Groundwater Measurements in Monitoring Wells**

Borehole (Well)	Surface RL (m, AHD)	Well Depth (m)	Measured Depth (m) and RL (m, AHD) to Groundwater in Monitoring Wells	
			23 November 2016	8 August 2019
1	2.4	4.9	1.6 (RL0.8)	1.7 (RL0.7)
2	2.3	4.0	1.2 (RL1.1)	1.0 (RL1.3)
3	4.1	5.8	2.7 (RL1.4)	2.9 (RL1.2)
4	2.1	4.0	1.4 (RL0.7)	destroyed

Groundwater levels will fluctuate and may temporarily rise by at least 1 m (or higher and up to flood levels) following prolonged rainfall. Further monitoring would be required to assess fluctuations in groundwater levels.

We trust the above satisfies your present requirements. Please contact the undersigned should you have any queries.

Yours faithfully,  
**Douglas Partners Pty Ltd**



**Scott Easton**  
Principal

Attached:           About this Report  
                          Drawing 1 – Location of Boreholes

# About this Report

# Douglas Partners



## Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

## Copyright

This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

## Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

## Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;

- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

## Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

# *About this Report*

## **Site Anomalies**

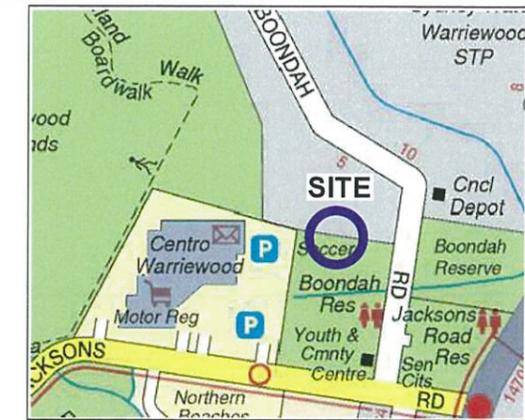
In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

## **Information for Contractual Purposes**

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

## **Site Inspection**

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.



**Locality Plan**

NOTE:  
 1: Base image from Nearmap.com  
 (Dated 17 November 2016)  
 2: Test locations are approximate only and are shown  
 with reference to existing features.



**LEGEND**  
 + Borehole location



CLIENT: Henroth Investments Pty Ltd  
 OFFICE: Sydney      DRAWN BY: PSCH  
 SCALE: 1:2500 @ A3      DATE: 25.11.2016

TITLE: **Location of Boreholes**  
**Proposed Bulky Goods Centre**  
**3-12 Boondah Road, WARRIEWOOD**

	PROJECT No: 85749.00
	DRAWING No: 1
	REVISION: 0